FRICTION

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What is friction?

Friction is an interaction between two objects in contact that opposes relative motion of those two objects.


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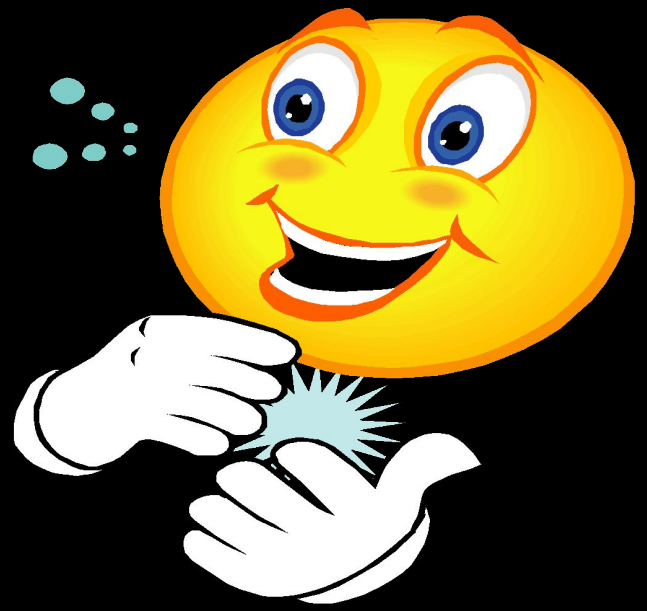
Friction always works in the direction opposite from the direction the object is moving, or trying to move.

Moving

Friction

Friction also produces heat.



Factors affecting Friction

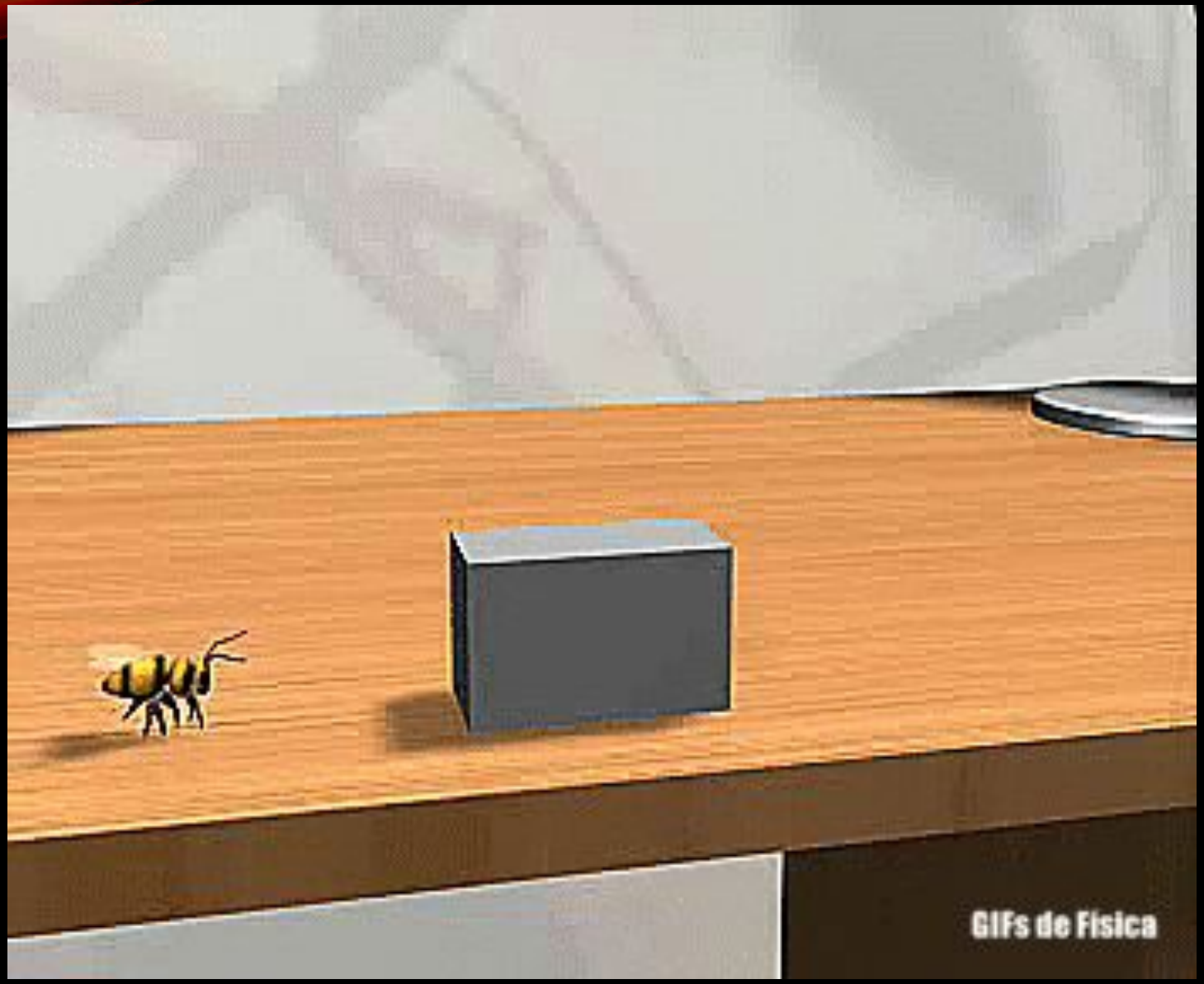
- Nature of two surfaces
- Weight of the object

TYPES OF FRICTION

- STATIC FRICTION
- SLIDING FRICTION
- ROLLING FRICTION
- FLUID FRICTION

STATIC FRICTION

Static friction exists between a stationary object and the surface on which it is resting. It prevents an object from moving against the surface.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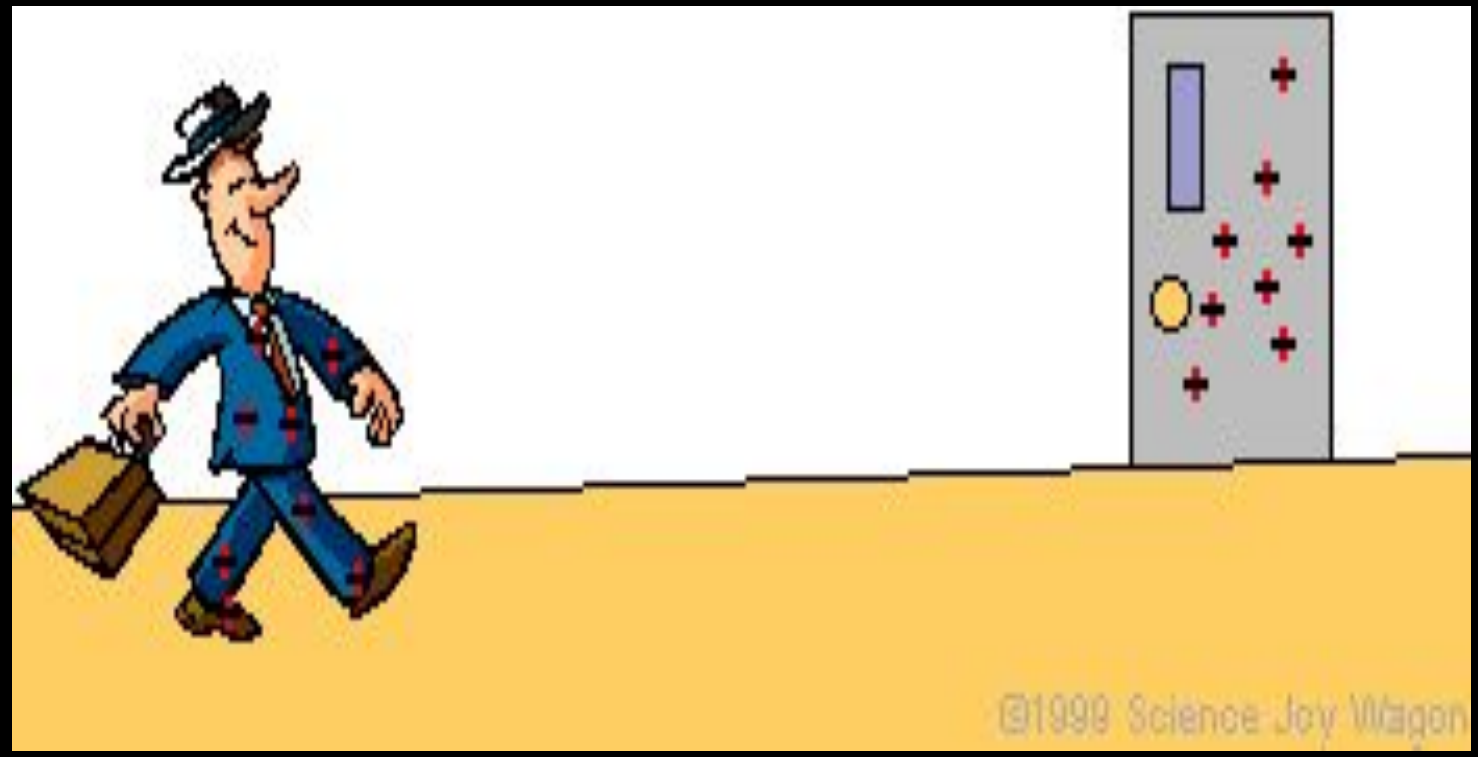
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CAUTION
WET
FLOOR

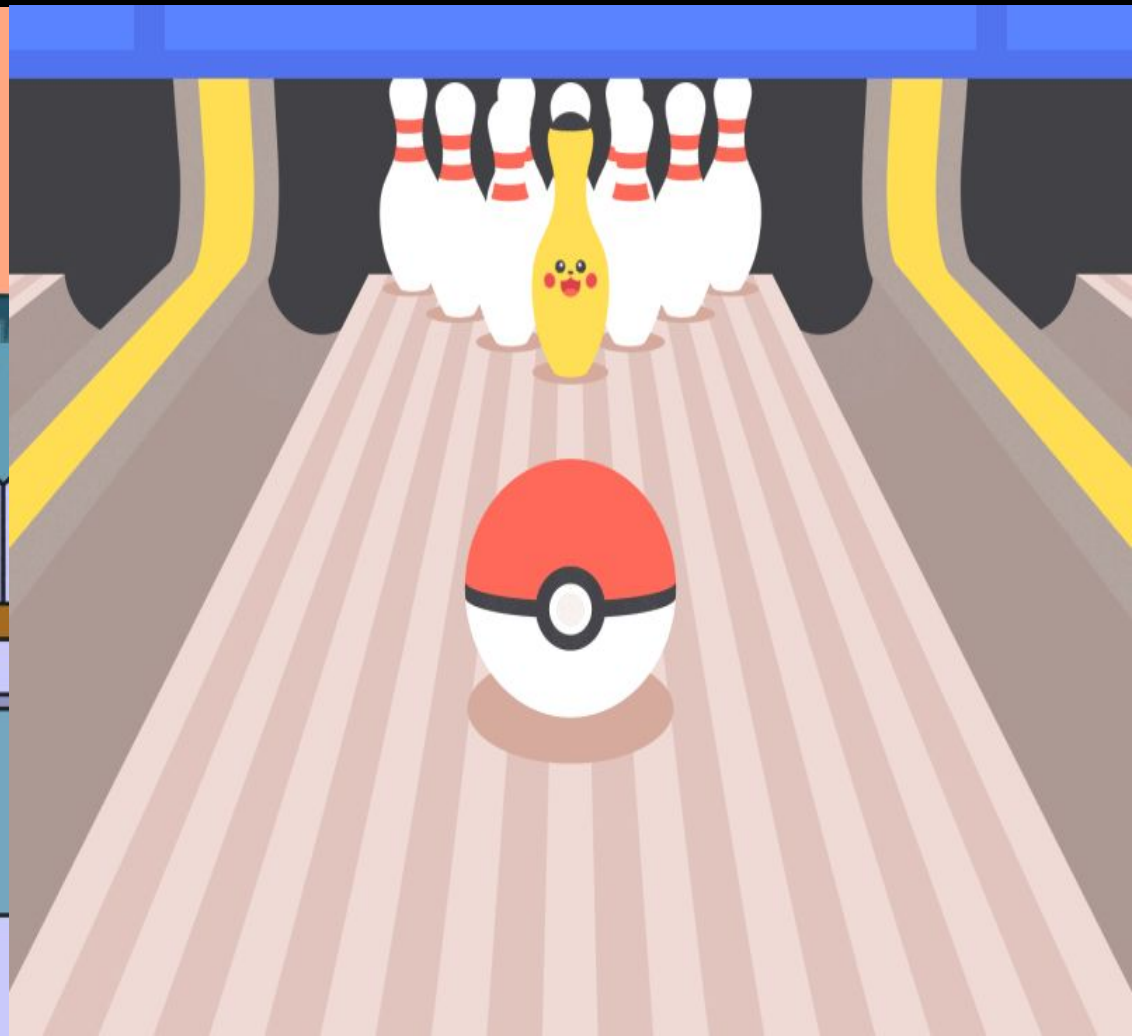
SLIDING FRICTION

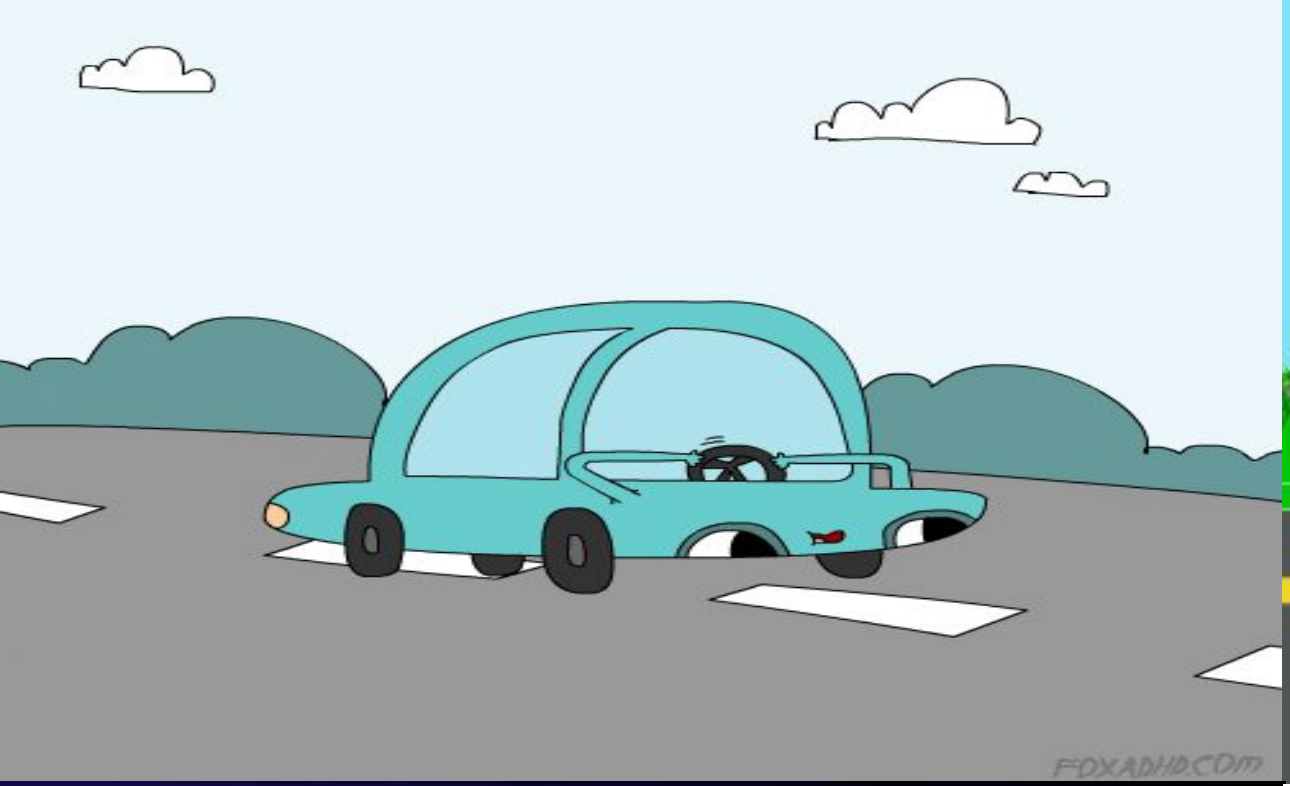
It occurs between objects as the slide against each other.

It is also called as kinetic friction.

ROLLING FRICTION

It hinders the motion of an object rolling on a surface, that means it slows down the motion of an object rolling on a surface.

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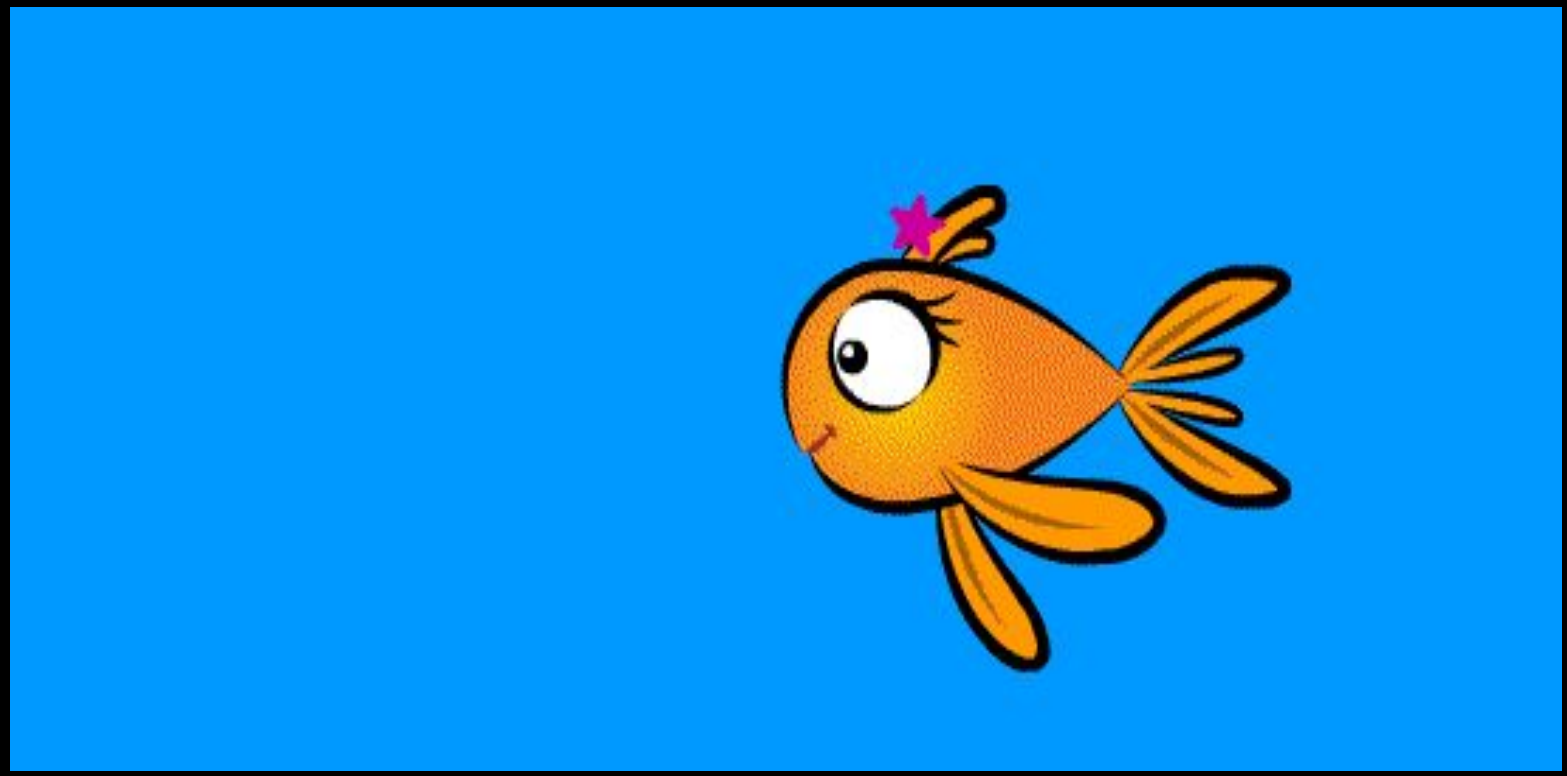
FLUID FRICTION

It is experienced by the objects moving through a fluid. Fluid friction acts between the object and the fluid through which it is moving.

It is also called as drag.




BYE!
BYE!

ADVANTAGES OF FRICTION

IN PERFORMING ARTS

- **Without friction slipping would have occured often while Ballet dancing and performing all types of gymnastics.**

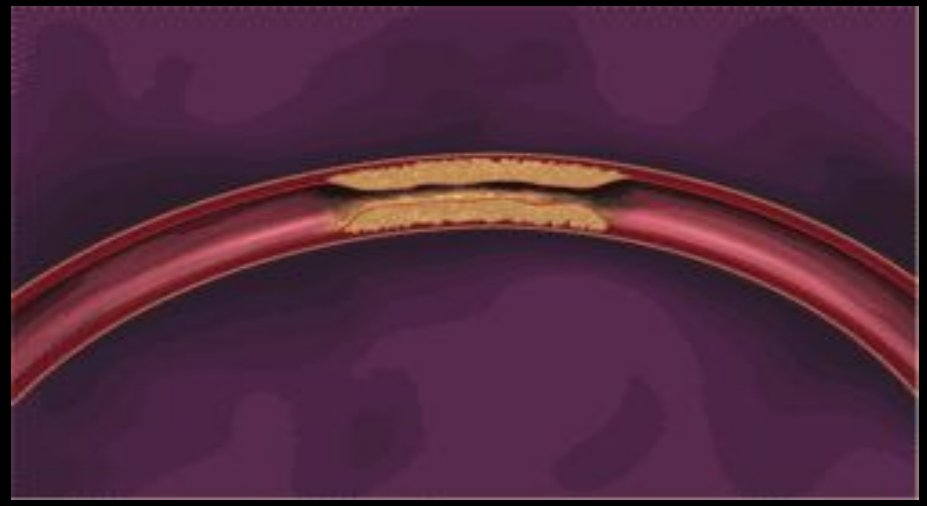
IN ANIMALS

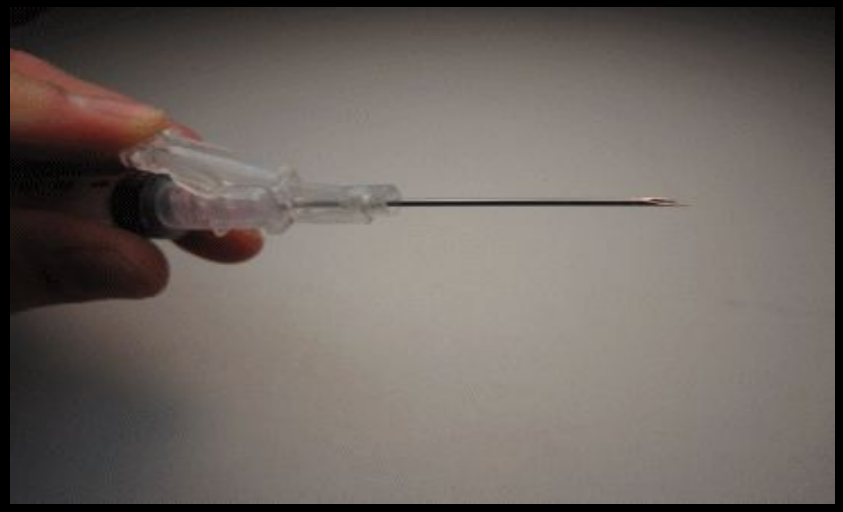
- **All Anthropoids(Monkeys and Apes) and Prosimians(Lemurs) have friction ridge skin on their palms and soles of feet.The ridges in the skin enable them to grasp and hold objects due to friction.**

•**Fluid friction allows birds to decrease their speed on landing by stretching their wings and thus reduce impact.**

IN MEDICINE

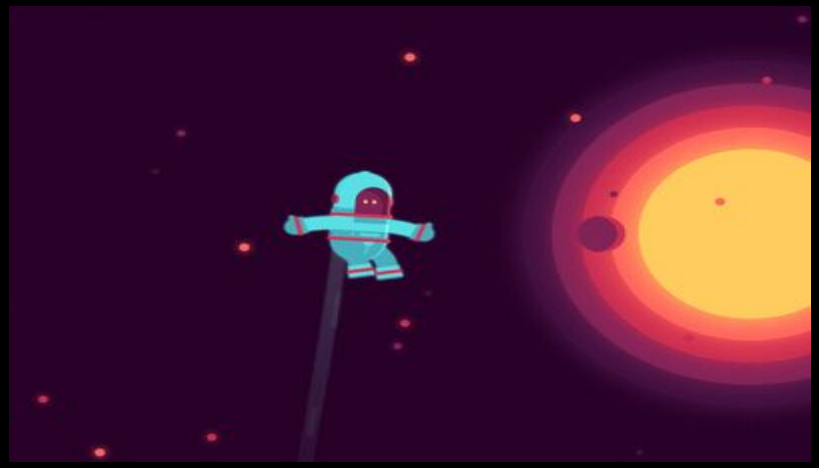
The design of medical devices that contact the body must involve the consideration and measurement of friction, or the relative slipping motion of a material over another material.





IN SPACE

- A body once set in motion in space due to an external force would continue to be in motion without any end to it, because without friction no body can stop moving.



- Friction helps to protect the life on Earth by burning asteroids.After striking the Earth’s atmosphere, the friction of the atmosphere slows the asteroids and tends to separate them into smaller pieces.

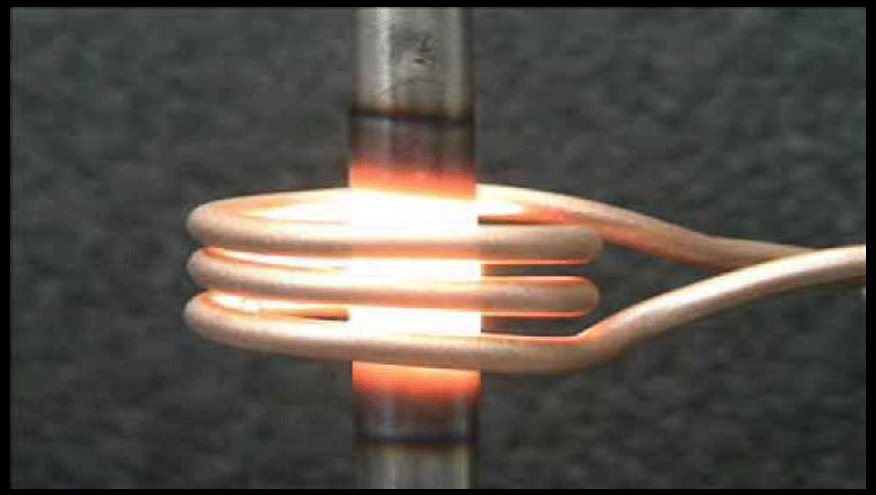
ON WEATHER

•Friction decreases surface wind speeds, making them less volatile. Rugged terrain, trees and buildings create friction that acts on wind speed.

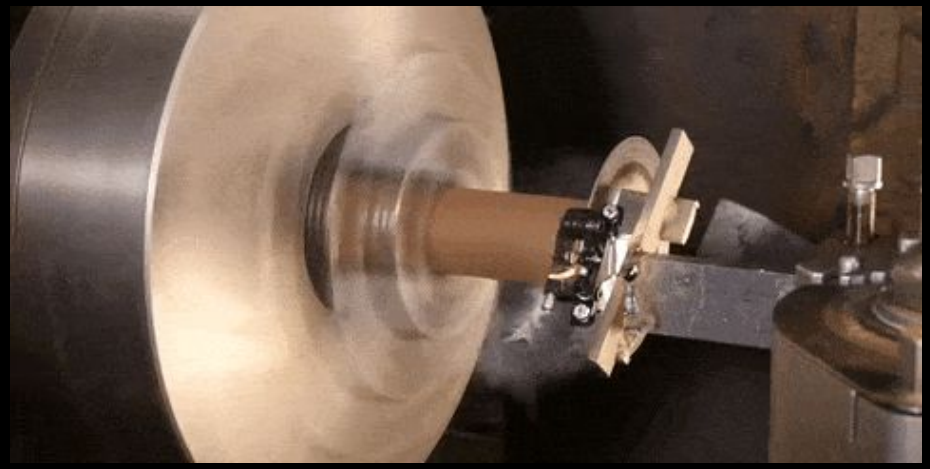
DISADVANTAGES OF FRICTION

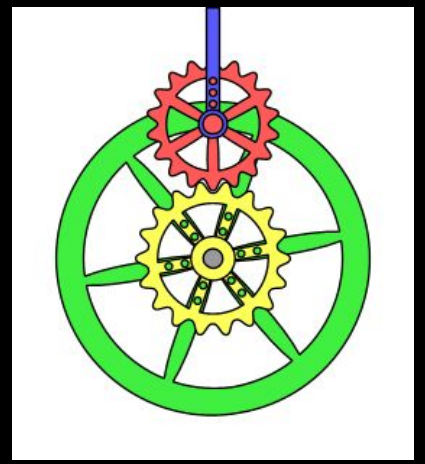
IN MACHINERY

- Friction causes the moving parts in machines and automobiles to heat up. This results in wastage of energy and fuel.



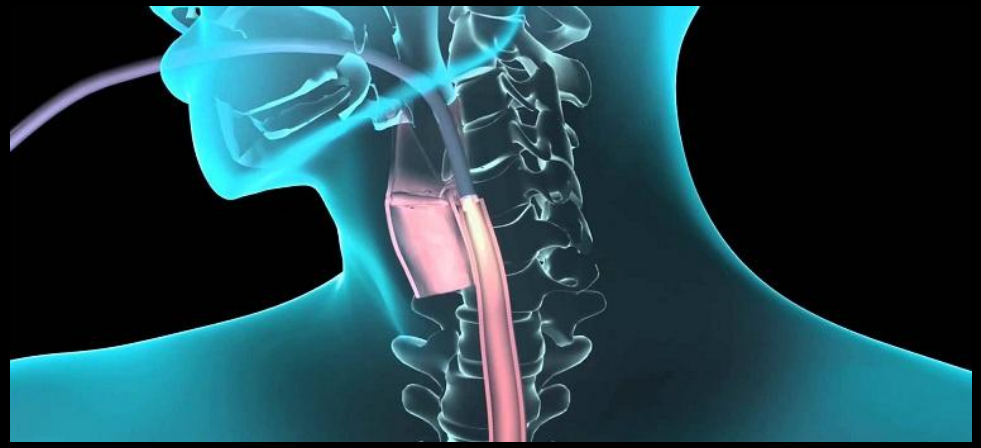
- It causes wear and tear of the parts that rub each other and produce noise.





IN HUMAN BODY

- In medical apparatus,the heat produced by friction may cause the abrasion of the skin, resulting in friction burn.



- In Osteoarthritis,when there is bone-on-bone contact due to loss of cartilage, the bones can become damaged due to friction. The friction can cause pain, swelling in the joint and lead to bone spurs.

IN NATURE

- Forest fires are caused due to friction between branches of trees rubbing against each other.

Wear and tear due to friction depends on 2 factors:-

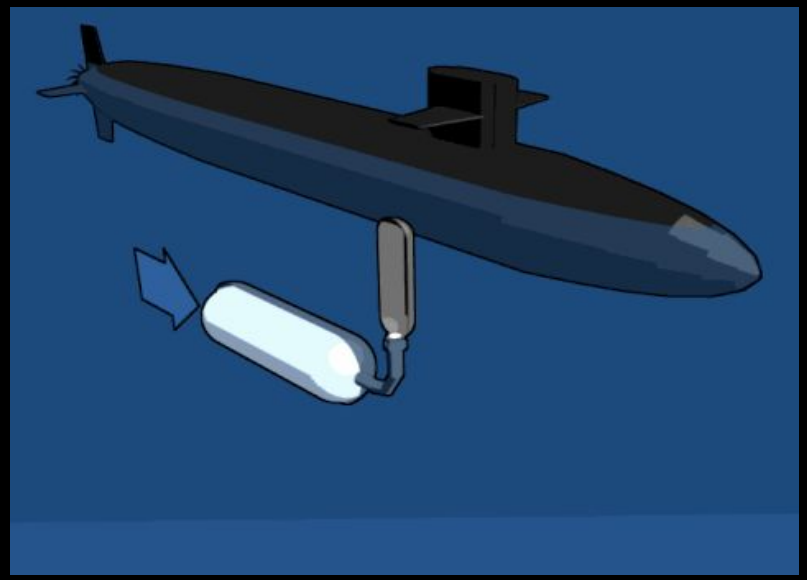
- Roughness of the two surfaces in contact
- The amount of time the two surfaces rub against each other.

METHODS OF DECREASING FRICTION

1)**Using lubricants such as Oil and grease**-They are smoother than any solid surface and hence allow objects to slide across each other more easily. Examples of lubricants used in medical devices include silicone and polyphenyl ethers .

2)**Using ball bearings**-A layer of ball bearings between two surfaces in a machine reduces the amount of contact between surfaces.

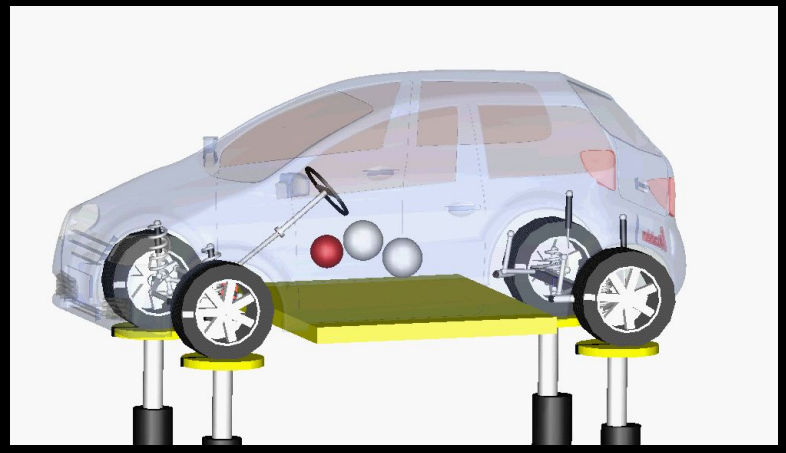
3)Designing streamlined shapes-To reduce friction due to fluids,aircraft and ships are built in streamline shapes.



METHODS OF INCREASING FRICTION

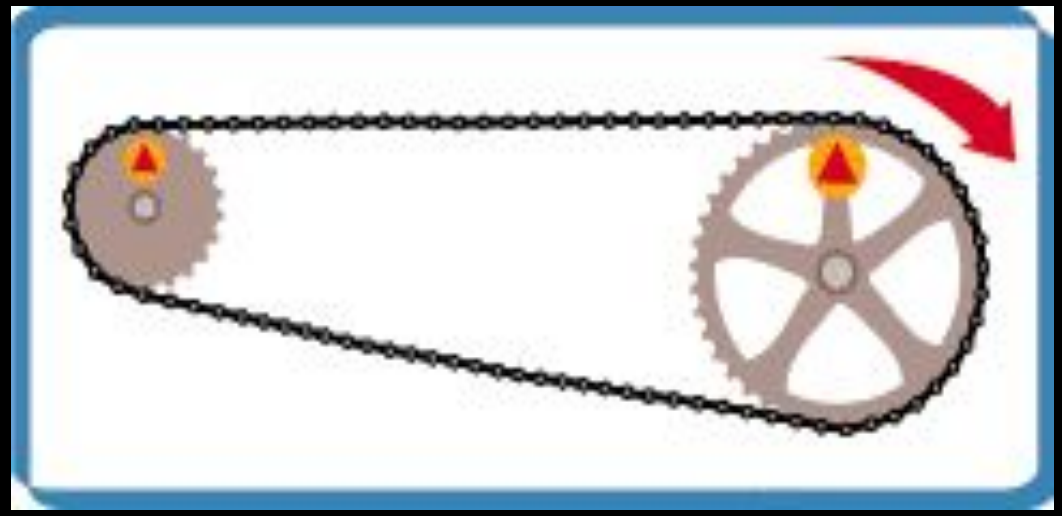
1)Making the surfaces rough.

2)Increasing the mass of the object that is moving.



3)Gymnasts apply coarse material on their hands to increase friction for better grip.

4)Machine belts are made of special materials to increase friction and drive machine wheels properly.



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